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HUMAN RESOURCES

ADVANCED ON-THE-JOB TRAINING SYSTEM:
CONFIGURATION MANAGEMENT PLAN

Douglas Aircraft Company
A Division of McDonnell Douglas Corporation
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TRAINING SYSTEMS DIVISION
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This paper has been reviewed and is approved for publication.

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The Advanced On-the-job Training System (AOTS) Configuration Management Plan describes the technical and managerial approach used for conducting the Configuration Management effort. Configuration Management is the means through which the integrity and continuity of design, engineering and cost trade-off decisions made between technical performance, and operability and supportability are recorded, communicated and controlled by program and functional managers. As such, the AOTS Configuration Management Plan addresses: Configuration Management Organization, Configuration Control, Software Configuration Authentication, Configuration Status Accounting, Interface Management, Configuration Audits, Subcontractor/Vendor Control, and Configuration Management milestones.

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ADVANCED ON-THE-JOB TRAINING SYSTEM:
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SUMMARY

The Advanced On-the-job Training System (AOTS) was an Air Staff directed, AFHRL developed, prototype system which designed, developed, and tested a proof-of-concept prototype AOTS within the operational environment of selected work centers at Bergstrom AFB, Texas, and Ellington ANGB, Texas, from August 1985 through 31 July 1989. The AOTS Configuration Management Plan describes the technical and managerial approach used for conducting the AOTS Configuration Management effort. Configuration Management is the means through which the integrity and continuity of design, engineering and cost trade-off decisions made between technical performance, and operability and supportability are recorded, communicated, and controlled by program and functional managers. As such, the AOTS configuration management documents and controls the entire development process. The AOTS Configuration Management Plan addresses: Configuration Management Organization, Configuration Identification, Configuration Control, Software Configuration Authentication, Configuration Status Accounting, Interface Management, Configuration Audits, Subcontractor/Vendor Control, and Configuration Management Major Milestones.

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PREFACE

This paper was prepared by Douglas Aircraft Company, the AOTS Development contractor, under Government Contract Number F33615-84-C-0059. The AFHRL Work Unit number for the project is 2557-00-02. The primary office of responsibility for management of the work unit is the Air Force Human Resources Laboratory, Training Systems Division, and the Air Force AOTS manager is Major Jack Blackhurst.

The Advanced On-the-job Training System (AOTS), systematically applies state-of-the-art technology to Air Force On-the-Job Training (OJT). The AOTS comprises five subsystems, each of which includes a set of related components designed to accomplish those functions required for the development and operation of an effective OJT system. The five systems comprising the AOTS are: (a) management; (b) evaluation; (c) computer support; (d) personnel and support; and (e) training development and delivery. Within the AOTS, the Training Development and Delivery Subsystem is intended to operate, and will be designed to operate as an independent subsystem. The contractor shall design, develop, implement, demonstrate, and test the AOTS system, subsystems, and their components. The Government will provide an Air Force technical team, Instructional System Team (IST), to be collocated with the contractor. All evaluation instruments and curriculum materials used within the prototype AOTS will be developed by the IST. The AOTS subsystems shall be integrated into a total functional system, which will be demonstrated and tested in order to determine its operational capabilities as a prototype OJT system. The AOTS capabilities required include: identification of performance and training requirements; management of training, including job-site training delivery; evaluation of airman task performance; evaluation of program effectiveness; and OJT management analysis data output to appropriate Air Force training management levels.

T A B L E   O F   C O N T E N T S

L I S T   O F   F I G U R E S

v

LIST OF APPENDICES

1. INTRODUCTION

1.1. Purpose and Scope

This AOTS Configuration Management Plan describes the technical and managerial approach used for conducting the Advanced On-the-Job Training System (AOTS) Configuration Management (CM) effort. The Plan establishes the organizational responsibilities and interfaces, the sequence of major events, and reporting tools required to: identify and document the AOTS baseline configuration; control changes to the baseline; track the status of configuration; and prepare and submit contractually required program data.

1.2. Definitions

Terms not defined in the body of this plan are per the definitions of DOD-STD-480A Appendix E, MIL-STD-482, and MDAC Control Procedure 2.001 (see Appendix B).

1.3. Configuration Management Summary

AOTS Configuration Management (CM) provides the formal structure and discipline needed to: (1) identify, track, control, and trace the AOTS design and, (2) assess and document the impact of proposed changes.

CM is the means through which the integrity and continuity of design, engineering and cost trade-off decisions made between technical performance, operability and supportability are recorded, communicated and controlled by program and functional managers. As such, the CM function, documents and controls the entire development process. CM benefits the AOTS Program in three ways:

   a.   It provides precise identification of the configuration of each configuration item.

   b.   It produces results through the identification of baselines and changes to them, thus permitting analysis and correction.

   c.   It provides a formal structure for assessing impacts of proposed changes.

   d.   Capable of handling expedited changes.

Technical and administrative controls will be applied by AOTS to define and evaluate the total system effect of all proposed changes to established baselines. The AOTS Configuration Control System is the first line authoring agency for preparation of proposed changes, analysis, tracking the progress of changes, approval/disapproval, planning, co-ordination and implementation of approved changes to established baselines. All AOTS CCB approved Class 1 Changes will be forwarded to AFHRL on a

Engineering Change Proposal (ECP) for handling in accordance with the AOTS CM Plan. (See section 5.2.2.3 Change Classification for definition of Class 1 Changes.) The AOTS CCB will be co-chaired by the AFHRL chief and the AOTS Program Manager or their designees. Approved baseline changes will be classified, prepared, and submitted under the guidelines of DoD-STD-480A and MIL-STD-482, Configuration Control - Engineering Changes, Deviations and Waivers, as modified by the Statement of Work (SOW), and implemented by procedures described herein.

AOTS CM will provide interim configuration status accounting reports during development.

This Configuration Management Plan (CMP) addresses the following areas:

- Configuration Management Organization   Section 3.0

- Configuration Identification   Section 4.0

- Configuration Control   Section 5.0

- Software Configuration Authentication   Section 6.0

- Configuration Status Accounting   Section 7.0

- Interface Management   Section 8.0

- Configuration Audits   Section 9.0

- Subcontractor/Vendor Control   Section 10.0

- Configuration Management Major Milestones   Section 11.0

1.4. System Integration

1.4.1. Approach and Task

The AOTS system integration task has been tailored to the requirements of the AOTS program and AOTS engineering effort. The approach is iterative and consists of various overlapping elements as defined in the AOTS Software Development Plan.

1.4.2. Configuration Management Integration

1.4.2.1. Baseline Establishment

Baseline establishment is described in section 4.1.

o   Integration

The initial software and hardware will be integrated, tested, and installed in accordance with the Detail Specification, Software Development Plan, System

Engineering Management Plan, and the Software Test
Plan.

o   Development Test & Evaluation

AOTS hardware and software will be subject to
System Level Testing and Evaluation (SLT&E).   The results
of these tests will be recorded and analyzed for
technical performance.   Test results will be used to
correct defects prior to final integration and release.

Test results will also be reviewed with respect to system
validation for operational evaluation.

2. APPLICABLE DOCUMENTS

The following documents and associated references will be used as
guidance for the AOTS Configuration Management Plan only to the
extent specified herein.   The Military standards are to be used
for guidance only unless so required in the SOW or the A
specification (70S647000).

MILITARY STANDARDS	ISSUE DATE	TITLE
- DoD-D-100C	31 OCT 80	Numbering, Coding, and Identification
- MIL-S-52779A	01 AUG 79	Software Quality Assurance Program Requirements
- DoD-STD-480A	12 APR 78	Configuration Control-Engineering Changes, Deviations & Waivers
- MIL-STD-481A	12 OCT 72	Configuration Control-Engineering Changes, Deviations and Waivers (Short Form)
- MIL-STD-482A	1 Apr. 74	Configuration Status Accounting Data, Elements and Related Features
- MIL-STD-483A	4 JUN 85	Configuration Management Practices for Systems, Equipment, Munitions, and Computer Programs
- MIL-STD-490A	4 JUN 85	Specification Practices
- MIL-STD-1521A	21 DEC 81	Technical Reviews and Audits for Systems, Equipment and

- MIL-STD-1679A   22 OCT 83   Software Development

' CDRLs contain relivant data for the Configuration Management |
System and are listed here for reference.   All CDRL deliverable |
items will be controlled by the CM system. |

CDRL ITEMS	TITLE
1	R & D Status Report
2	Cost/Schedule Status Report (C/SSR)
3	Presentation Material
4	Informal Technical Information
5	Data and/or Analysis Summary
6	Abstract of New Technology (ANT)
8	System/Design Trade Study Reports
9	Technical Reports/Interim Reports
10	Technical Reports/Final Reports
11	Contract Work Break down
13	Progress/Status Meeting Report
14 ·	Project Status Report, Computer Software
15	Engineering Change Proposal (ECP)
16	Commercial/Computer and Peripheral Equipment Manuals
17	Computer Software Test Plan
18	Computer Program Test Report
19	Configuration Management Plan (CMP)
20	Computer Program Standard
21	Computer Software Test and Evaluation Reports
22	Minutes of Formal Reviews, Inspections and Audits
23	Software Development Plan
24	Procedural Guide

25	Software System (User Manual)
26	System Engineering Management Plan (SEMP)
27	System Specification
28	Configuration Item Development Specification
29	Master Test Plan/Program Test Plan (MTP)
30	Site Preparation Requirements Equipment Installation Plan
31	Maintenance Plan
32	Computer System Operational Manual
33	Maintainability Program Plan
34	Reliability Program Plan
35	Human Engineering Program Plan
36	Contract Funds Status Report
37	Computer Software/Computer Program/Computer Data Base Configuration Item(s)

AOTS developed specifications will define aspects of the Configuration Management requirements and they in turn will be controlled by the CM system.

AOTS SPECIFICATION	DATED	DESCRIPTION
70S647000	May 5, 1986	AOTS System
70S647100		Management Subsystem
70S647200		Training Development and Delivery Subsystem
70S647201		Training Development Component
70S647202		Training Delivery Component
70S647300		Evaluation Subsystem
70S647400		Computer Support Subsystem
70S647401		Hardware Component

70S647411B	Management CPCI
70S647412B	Training Development and Delivery Subsystem
70S647413B	Evaluation CPCI
70S647414B	System Support CPCI
70S647500	Personnel and Logistics Support Subsystem
70S647411C	Management CPCI
70S647412C	Training Development and Delivery Subsystem
70S647413C	Evaluation CPCI
70S647414C	System Support CPCI

Note: Specifications with a suffix of "B" refer to B5 and "C" refers to the C5 specications.

3. CONFIGURATION MANAGEMENT ORGANIZATION

The MDAC AOTS Program Manager (his designee is the configuration management manager) is the single point contact to AFHRL regarding the execution of the details and intention of this plan.

Configuration Management has CM responsibility and authority to enforce AOTS's CM policies and procedures. CM performs four functions in the AOTS Program Organization: Configuration Identification, Configuration Change Control, Configuration Status Accounting, and Configuration Audits.

Configuration Management, organizationally reports functionally to the MDAC AOTS Program Manager for the effective performance of the configuration management functions. CM will provide the necessary visibility into the development process at any given time. CM will be the focal point for all matters relating to configuration change; and will enforce the CM policies, practices and procedures enabling CM to carry out this mandate. The Configuration Manager or his designee will administer all Configuration Control Board (CCB) reviews co-chaired by the MDAC AOTS Program Manager and the AFHRL/OL-AK chief.

The AOTS organization charts for the AOTS program as it relates to configuration control is shown in Figure 3-1.

AOTS CONFIGURATION MANAGEMENT ORGANIZATION
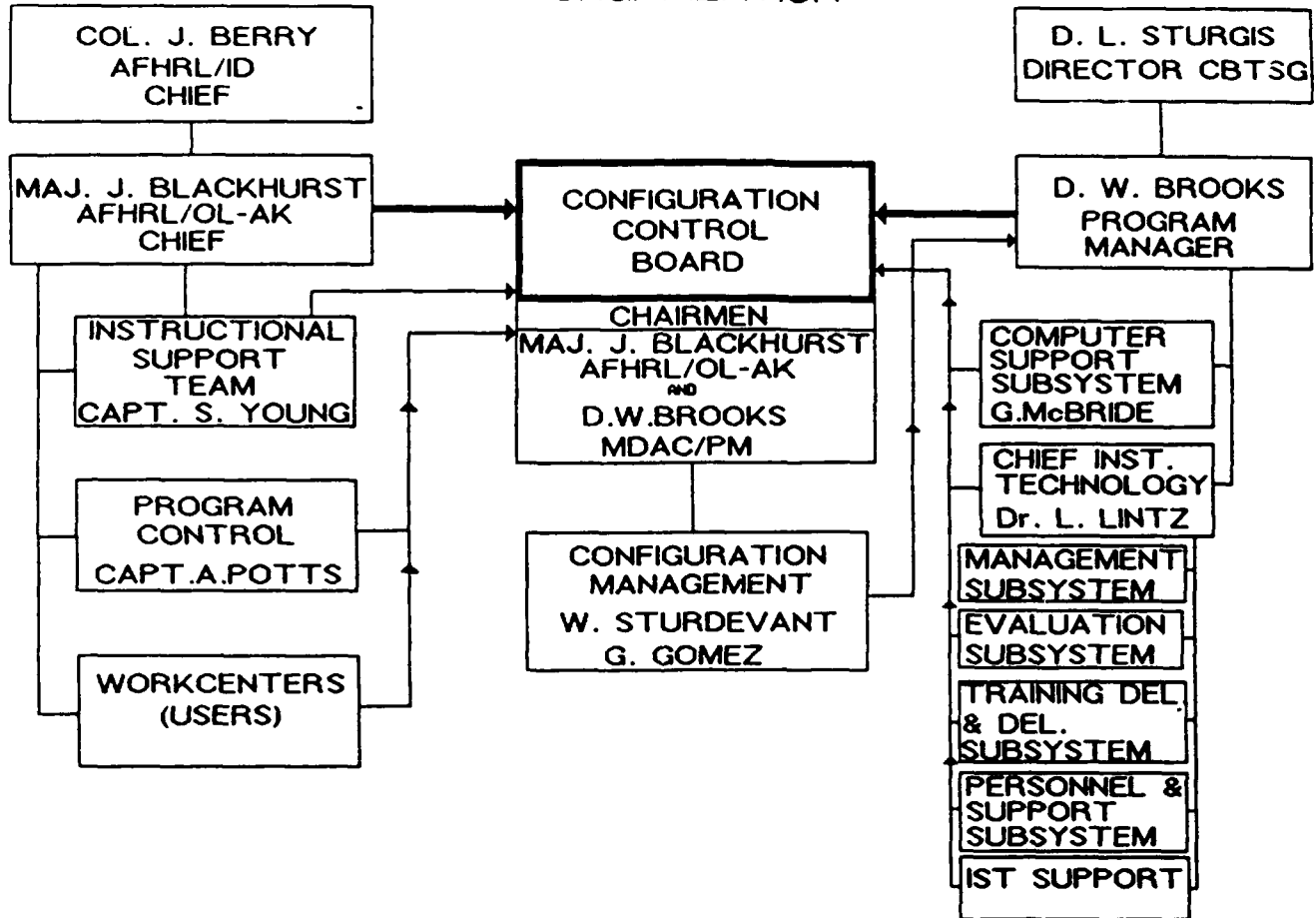
Fig. 3-1: AOTS Organization Chart

4. CONFIGURATION IDENTIFICATION

AOTS CM will use vendors' commercial identification and serialization, to the extent that they exist for off-the-shelf hardware/software. CM will develop an internal identification and serialization program which builds on existing definition and complies with the standards and requirements of the AOTS contract and Statement of Work (SOW).

Configuration identification is the current approved or conditionally approved technical documentation for a Hardware Configuration Item (HWCI) or a Computer Program Configuration Item (CPCI) as set forth in specifications, drawings, and associated lists, and documents referenced therein. This technical documentation defines the functional and/or physical characteristics of a system, equipment, or item which have been (or is to be) achieved in the AOTS product.

The objective of configuration identification is to establish and record the approved technical description of the AOTS system, equipment, or item designated for configuration management. The description will be the basis for configuration control, and will be maintained throughout the life cycle of a HWCI or CPCI, starting with the initial configuration and continuing with configuration updates resulting from the incorporation of approved changes.

The aggregate of the documentation which describes the individual systems, subsystems, and items results in the establishment of AOTS baselines.

There are two aspects of Configuration Identification:

o   Identification of the configuration item by its description through its design specifications, test documentation, operator's manual, and listings.

o   Identification of the documents by name, a unique number, other identification, and cross-reference listings.

4.1. Baseline Establishment

Baselines are AFHRL-approved technical descriptions that provide the basis for configuration control and status accounting. They consist of a configuration identification document or a set of such documents which define the item involved at a specific point in time of the AOTS program. Figure 4-1 illustrates the hardware and computer program configuration item control forms.

HARDWARE AND SOFTWARE
CONFIGURATION ITEM CONTROL

HARDWARE CONFIGURATION ITEM

SOFTWARE CONFIGURATION ITEM

AOTS0010-9

AOTS0010-16
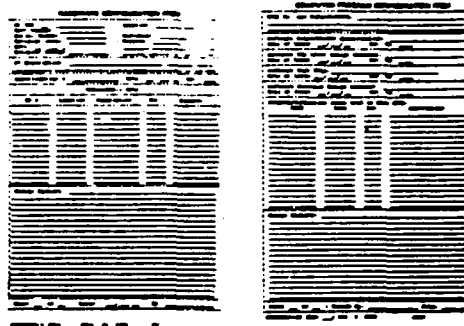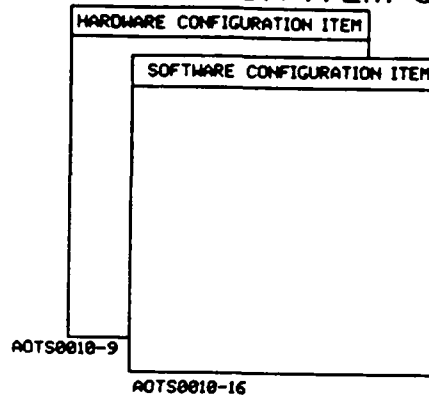
Fig. 4-1: Baseline Configuration Control Forms

The baseline for the AOTS prototype system has been established
with the PDR and completion of Phase I of the contract.   At that
time, the preliminary designs and specifications for the system
and each of the five subsystems was established.   Any changes
henceforth require use of the configuration control system.

The establishment of the baseline for the design of each CPCI is
the conclusion of the interim technical review and CDR.   The
actual CPCI source code will become baselined prior to software
system level testing.   At this point, CPCI baseline description
documentation will be prepared (CPCI form).   All source software
CPCIs (at lowest level to highest level) will always be under
Source Code Control System (SCCS).   SCCS is a software control
package on the host computer system.   SCCS will be the principal
tool used to control all source software code from the beginning
of development through finished product.   SCCS will also be used
as the controlling device for the subsequent maintenance and

enhancement of any part of the software system.

The establishment of the baseline for the HWCIs is set by the actual installation of equipment. At that time, all HWCIs will be documented in HWCI description documentation (use of Hardware Configuration Item form).

This point is the point of departure for control of future changes. AOTS Baselines, plus approved changes to those baselines, constitute the current configuration identification.

Formal baselines will be established for Advanced On-The-Job Training System (AOTS):

- o   Functional

- o   Allocated

- o   Product

4.1.1. Functional Configuration Identification (FCI)

The Functional Baseline is a set of documents that defines all necessary functional (performance requirements of a CPCI).

The Configuration identification for this baseline consists of the A System Specification document. This document is baselined at the completion of the System Level Design Review and needs to be established at not later than CDR.

4.1.2. Allocated Configuration Identification (ACI)

The configuration identification for the Allocated Baseline consists of the B1 Prime Item Specifications, B2 Critical Item Specifications and the B5 Computer Program Configuration Item Development Specification. These documents are baselined at the completion of the Preliminary Design Review (PDR).

4.1.3. Product Configuration Identification (PCI)

The Product Baseline is the documentation of all those parts and equipments that collectively meet the requirements of the Functional Baseline. The Product Baseline not only describes the "build to" or "form fit," and functional requirements but their associated acceptance test requirements. The design Product Baseline documentation is established at CDR.

The configuration identification for the Product Baseline consists of the updated Computer Program Product. These specifications are baselined at the completion of software system testing and the completion of the Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA).

4.2. Hardware Identification

4.2.1. Hardware Identification Method

AOTS will develop a reference designator system of identification traceable to the rack, unit, and component level, and implemented throughout the program under guidance of Appendix IX of MIL-STD-483A. This reference designator will track to the lowest line replaceable unit (LRU) level, as designated through the logistics support program. Product identification requirements will be specified in the product baseline documentation package, including as applicable:

    a. Marking

    b. Hardware Part Number

    c. Program/Data Names

    d. Media identifiers

    e. HWCI identifiers

    f. Serial Numbers

    g. Program Version identifiers

    h. Firmware identification

    i. Nomenclature

Specific identification number blocks and assignments will be developed by AOTS in conjunction with vendors and subcontractors, and assigned through configuration management.

Appendix E contains the identification schema that will be used for the prototype AOTS system at Bergstrom AFB, Texas.

4.2.2. Hardware Configuration Item (HWCI)

The following guidelines will be used to identify HWCIs whenever possible and practical.

    o   HWCI identifiers will not exceed seven (7) alphanumeric characters.

    o   HWCI sub-level identifiers will be made up (not to exceed seven alphanumeric characters) to the lowest level inter-changeable part (i.e. a subassembly not component level).

    o   A hierarchy of designations will be established and used for each HWCI.

The hierarchy is estabilished and can be found in appendix D.

4.2.3. Serialization

To ensure adequate control of change incorporation, serialization requirements will be identified to each separable Line Replaceable Unit (LRU) level. Existing vendor serial numbers will be used to the greatest extent possible. When serial number identification of vendor-supplied hardware is inadequate, the CM manager will ensure the proper application of a identification number.

4.3. Software Configuration Identification

Software change control procedures will be implemented before development and before hardware and software component integration, as a means of ensuring intercommunication among the engineering elements in order to anticipate the impacts of changes in one item upon the others. As baselines are developed, configuration status will be tracked to ensure the integrity of the baseline. AOTS will develop document control codes for all the required software specifications, and a CPCI number for each CPCI. Source code listings will be used to establish the detailed configuration identification of the software.

Re-identification of the software, up to and including the CPCI level, will be accomplished to track changes to executable codes and data.

4.3.1. Computer Program Identification Structure

The computer program identification structure shall consist of Computer Program Configuration Item(s), Computer Program Component(s), and Computer Program Module(s).

A CPCI will consist of one or more computer porgram components. For AOTS there are four CPCIs:

- o   Evaluation CPCI

- o   System Support CPCI

- o   Management CPCI

- o   Training Development and Delivery CPCI

A CPC is a functionally, logically distinct part of a CPCI. A CPC is identified for purposes of convenience in specifying and developing a CPCI as an assembly of subordinate elements. A CPC consists of a logical composition of one or more subordinate or interfacing modules.

- o   Computer Program Component (CPC)

A CPC is the actual computer program in the form of computer instructions stored on machine-readable media. All CPCs will be recorded on the CM Library System. The CPC identification method is described below:

Structure: The format of the CPC ˉ   re xxxyyyz

Where - xxx = EVL (EVALUATION), MGT (MANAGEMENT), SUP (SYSTEM SUPPORT)

Where - yyy = Numeric code identifying the package within the CPCI.

Where - z   = P for the procedure type of the package. |

o   Computer Program Module (CPM)

A CPM is the smallest set of statements able to be assembled or compiled.

Structure: The format of the CPM IDs are xxxyyyz

Where - xxx = EVL (EVALUATION), MGT (MANAGEMENT), SUP (SYSTEM SUPPORT)

Where - yyy = Numeric code identifying the package within the CPCI.

Where - z   = P for the procedure type of the package. |

The naming conventions for the CPCs and CPMs are described in the AOTS Computer Programming Standards document.

4.4. Document Identification

4.4.1. Identification Method

All documents will be recorded on the CM Library system. The document code identification method is described below:

Structure: PP. Document ID

Where: PP   = 2-5 digit alphanumeric program code

Period (.) = constant separating program from document identifiers

Document ID = 7 digit or less document identifiers.

This document ID will be cross-referenced to the AOTS CDRL number. A list of the applicable documents for AOTS are listed in Section 2.0.

4.4.2. Specification Tree

The AOTS specification tree is shown in Figure 4-2.
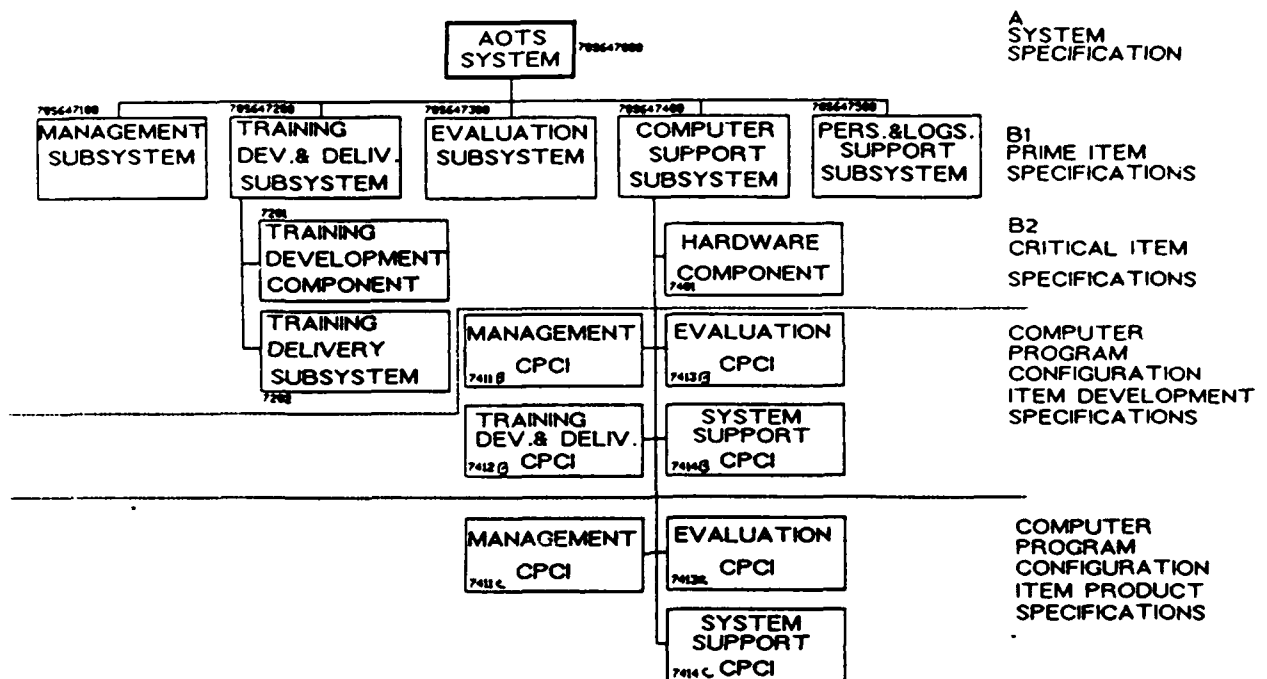
Fig. 4-2: AOTS Specification Tree

4.5. Program Release Identification

A Version Description Document (VDD) will be prepared at the time of the release of the product baseline.

4.6. Configuration Management Library

A library is maintained for both documents and software. A master of the current version of each baseline is maintained along with an audit trail to all changes. See Section 5.3

5. CONFIGURATION CONTROL

Configuration Control is the systematic and coordinated incorporation of approved changes to the existing internal and external baselines. This control assures that baselines are properly maintained.

The objective of configuration control is to define, document, and expedite necessary changes to the progressively established baseline configurations under guidance of DoD-STD-480A, while preventing changes that are not authorized or beneficial.

The functional baseline defined by the A System Specification establishes the initial identification of the AOTS System. This identification process will be expanded throughout the development phase as various reviews approve identification documents until the Functional Configuration Audit (FCA), when the documents will become part of the approved identification as defined in Section 4.0, Configuration Identification.

All changes proposed to the approved configuration identification shall be reviewed by the AOTS Configuration Control Board.

An overview of the AOTS Configuration Change Control System is shown in Figure 5-1.

The configuration control system is allowed to handle expeditated changes. Expeditated changes are those changes that are required on an immediate bases in order to correct "downing" events. Downing events are those which have a significant impact to normal operations. When these events occur, the configuration manager is authorized to expeditate a change through the system and call an emergency meeting of the configuration control board to handle the matter. During these events, normal procedures can be bypassed in order to restore the system. However, all paperwork associated with a change must be processed at a later time so that a full history of the change is provided.

Where expeditated change handling requires deviation from this plan, the CM manager, with approval from the CCB chairmen, may institute special procedures.

Figure 5-1. AOTS Configuration Change Control System.

5.1. Configuration Control Administration

5.1.1. AOTS Configuration Management Group

AOTS Configuration Management group is responsible for performing all CM functions. CM is also responsible for coordinating the Configuration Control Board (CCB) and serves as the administrator of that body.

5.1.2. AOTS Configuration Control Board (CCB)

A AOTS Configuration Control Board (CCB) will be established at Bergstrom AFB with the authority to process both hardware and software changes. The AOTS CCB will be convened as required to analyze each proposed change, deviation, or waiver relative to the stated problem and to determine the action to be taken.

The AOTS CCB membership will consist of representatives from MDAC and AFHRL personnel. Each member will represent his respective organization's functions and will present its position. However, membership may vary at the discretion of the Chairmen, depending on the nature of the change.

The AOTS CCB will be co-chaired by the AFHRL chief and the AOTS Program Manager or their designee and will be recorded and tracked by Configuration Management (CM) (see Section 7.1). It will be a non-voting board with the Co-Chairmen making the final decisions on all changes.

An agenda for each proposed change, with available documentation will be provided to the CCB by CM in advance of each meeting, to aid the membership in establishing their recommendations regarding the total impact prior to disposition of each change. The CCB is responsible for judging the necessity of each proposed change by evaluating its operational, technical, and cost effectiveness.

5.2. Change Processing (AOTS Configuration Control System Flow)

5.2.1. Source of Changes

Sources of external and internal changes are:

- o Manufacturers Hardware Changes

- o Maintenance Action

- o Engineering Change Requests

- o Test/Problem Reports

- o User Recommended Changes

- o Operating System/Utility software change

Figure 5-2 represents the use of configuration control forms through out the configuration management process. These forms are contained in Appendix D to this document.

5.2.1.1. Manufacturers Hardware Change

When notification of hardware change is received from an equipment manufacturer it is sent immediately to the CM manager.

5.2.1.2. Maintenance Action

When a change in maintenance operation is desired an AOTS Maintenance Action Report Form is completed and forwarded to the CM Manager. (See Appendix D)

5.2.1.3. Engineering Change Requests

Request for Software or Hardware changes are to be written on an Engineering Change Proposal (ECP). Both forms follow the same process and are sent to the CM manager for logging and disposition.

5.2.1.4. Test/Problem Report

Discrepancies between baseline software operation and corresponding software documentation are to be recorded on a Software Trouble Report and forwarded to the CM manager for logging and disposition. (See Appendix D)

5.2.1.5. User Recommended Changes

Changes requested by users must use the Engineering Change Proposal Form and forwarded to the CM manager. (See MIL-STD-480A and MIL-STD-481A.)

5.2.1.6. Operating System/Utility Software Changes

Changes of this nature when reported by the manufacturer on a Manufacturer's Notice are to be forwarded directly to the CM manager. The CM manager will prepare an ECP for these types of changes.
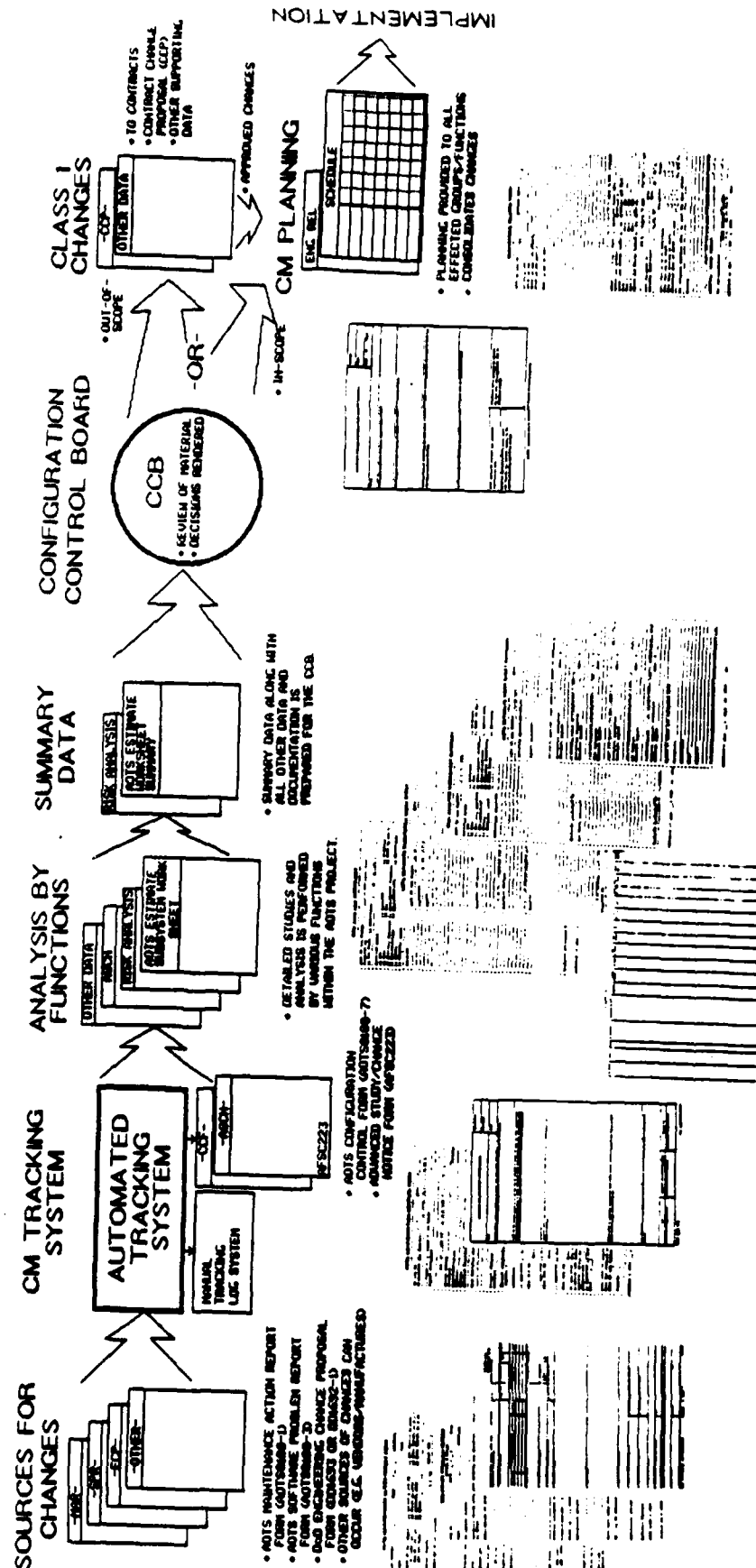
Figure 5-2: Configuration Control Forms Used Throughout
Configuration Management System for AOTS.

5.2.2. CM Control

The CM manager or his designate performs the following function on documents received:

- o   Log Control Number

- o   Enter date into CM Audit Tracking System

- o   Assign Classification

- o   Determine Routing

- o   Prepare AOTS Configuration Control Form

- o   Initiate AOTS Estimate Work Sheet Summary Form

- o   Initiate Advance Change/Study Notice Form (if applicable).

All paper work associated with any change will always accumulate. No step is authorized to remove any paper work from a change. Any additional data can be added as documentation to a change.

5.2.2.1. Log Control Number

The CM manager assigns a consecutive number to each applicable document received.

5.2.2.2. Enter data into CM Audit Tracking System

Pertinent data, now tied to a unique Control Number is entered into the Audit Tracking System. The CM manager will institute an automatic CM tracking system utilizing a Zenith Z-248 PC using a data base system.

5.2.2.3. Assign Classification

The CM manager assigns a change classification using MIL-STD-480A as a guide. Classifications are defined as follows:

- o   Class 1 change. Any change affecting cost, schedule, performance or the contract technical baseline.

- o   Class 2 change. Any change to correct errors (bugs) in computer programs or documentation which does not affect the "form, fit, or function" of a baseline. Class 2 changes are also defined as those which correct errors in approved baselines.

If the Configuration Manager can not make the determination of the classification, the Configuration Control Board (CCB) will make the decision. The CCB has the authority to make the final decision concerning change classification.

5.2.2.4. Determine Routing

The CM manager routes the appropriate forms, per this plan, that
are initiated under his control, including those described below.

5.2.2.5. Prepare AOTS Configuration Control Form

The CM manager completes the AOTS Configuration Control Form.
(See Appendix D.) The Configuration Control Form (CCF) will be
used to provide overall summary of a change and is used to show
approval/disapproval or other routing for a change. This form is
the "top" form for the configuration management process. For
Recommended Class 1 changes, which the CCB does not have
authority to authorized but only advise, will require a
Engineering Change Proposal and a Contract Change Proposal to be
prepared by the AOTS configuration management.

5.2.2.6. Initiate AOTS Estimate Work Sheet Summary Form

The CM manager initiates this form based on change classification
and determines proper routing. This form is used to accumulate
all estimates (manpower and schedule) of a proposed change. This
will be the third level form (top form being the CCF followed by
the Risk Analysis Worksheet Summary Form).

5.2.2.7. Initiate Advance Change/Study Notice Form

If deemed appropriate by the CM manager based on the magnitude of
the change requested this form is generated. (See MIL-STD-483A.)

5.2.2.8. AOTS Estimate Worksheet Form

An AOTS Estimate Worksheet form is provided to each group that
the configuration manager determines that may be affected by the
proposed change or change action. The form is used by the group
to report back the impact on the change on their group.

5.2.2.9. Risk Analysis Worksheet Form

The risk of any change must be analyzed and a project risk
statment made by the program management from both the Air Force
and MDAC.

5.2.2.10. Risk Analysis Worksheet Summary Form

The configuration manager will take the data from the Risk
Analysis Worksheet form and summarize the data from both the Air
Force and MDAC onto the summary form. This form will be the
second highest form (below the Configuration Control Form).

5.2.3. Evaluation Phase

Upon completion of the appropriate documents by the CM manager
the evaluation phase begins. During this phase the following

tasks are achieved:

o   Prepare Engineering and Subcontract Notification for Study/Estimate

o   Define Requirements for change and provide estimates

o   Log changes into Audit Tracking System (Configuration Status Accounting System)

o   Prepare Estimate and Risk Analysis Summary Forms

o   Update the Configuration Control Form with summary data from the Estimate and Risk Analysis Summary Forms

o   Gather input from other organizations as required

o   Use checklist to determine classification.

5.2.3.1. Engineering and Subcontract Notification

These notifications are prepared and distributed to the appropriate parties by Configuration Management. Their purpose is to solicit estimates/recommendations on the proposed change.

5.2.3.2. Define Requirements for Change and Provide Estimate

In the preceding phase the CM manager routed correspondence to appropriate recipients requesting data. In the evaluation phase these recipients are to supply the requested study/estimates/data.

5.2.3.3. Log Changes Into Audit Tracking System (Configuration Status Accounting System)

The CM manager or his designate is responsible for logging the progress of all change documents into the tracking system.

5.2.3.4. Prepare AOTS Estimate Work Sheet Summary

It is the responsibility of the CM manager to prepare an AOTS Estimate Work Sheet Summary Form from the studies/estimates/data provided. (See Appendix D.)

5.2.3.5. Gather Input From Other Organizations As Required

The CM manager is responsible for contacting whomever he deems necessary to prepare adequate documentation for the CCB.

5.2.3.6. Prepare Checklist

The CM manager prepares a checklist to assure that all required data is available. An AOTS Subsystem Worksheet Form (See Appendix D.) is to be completed by the manager of each affected subsystem. Areas which may be affected include Engineering,

Quality Assurance, Risk Analysis, Human Factors, Safety and Subcontractors. Typically the following data will be available for the CCB:

- Impact Analysis, Costs etc.

- Estimates

- Schedules

- Affected HWCIs and CPCIs

- Affected Documentation

- Affected Specifications

- Other data as required

5.2.4. Configuration Control Board (CCB)

The CCB is responsible for the following functions:

o   Review and Classify Change(s)

o   Evaluate Cost Impacts, Schedule, etc.

o   Approve/Disapprove Change(s) (Class 2 approval, advise approval of Class 1 changes).

o   Routing

o   Assuring that the Tracking/Status system is updated by the CM.

5.2.4.1. Disapproved changes

When a change is disapproved by the CCB the following actions take place:

o   The change is closed out and the CM manager updates the tracking system.

o   All pertinent data is archived.

o   The originator of the change request is notified (if applicable).

o   Any other individuals, groups, or organizations who have a need to know are notified.

If a Class 1 change is disapproved by the Air Force Contracting Officer, the disapproved change is handle in the same manner.

5.2.4.2. Approved Changes

Approved In-Scope changes proceed directly to the CM Planning Phase.

5.2.5. Approved Out-of-Scope Changes

When an out of scope change is approved the CM manager completes an Engineering Change Proposal and updates the Audit Tracking System. The ECP is forwarded to the Air Force Contracting Officer for resolution. Should the Air Force disapprove the change it is closed out and follows the same route of an in-scope disapproved change. (Refer to 5.2.4.1) Should the Air Force approve the change they contact the MDAC Contracting Officer and provide authorization to proceed. The change now enters the CM Planning Phase.

5.2.6. CM Planning Phase

When the CM manager is notified that either an in-scope or out-of-scope change has been approved he updates the tracking system accordingly. He also assures that the following actions take place:

o   A schedule for release is established.

o   The implementation and testing group is notified that the change is approved and instructed to proceed.

o   Individuals, groups, and other organizations who have a need to know are notified that the change is approved.

o   QA is notified.

o   The Audit Tracking System (Configuration Status Accounting System) is updated.

5.2.7. Implementation and Testing

During this phase the following functions are accomplished:

o   Hardware Changes are engineered (including development of a modification kit)

o   Software Changes are engineered

o   Unit and System level tests

o   Specifications are updated.

o   Documentation is updated.

o   Other documentation (as affected) is updated.

o   QA checks for specification compliance and assures conformity to standards.

o   QA assures that system meets functional requirements.

o   Beta test release data is prepared.

o   Internal Tracking System is updated.

o   Recycle any change as a result of Beta testing where
    the problem has not been fully corrected.

Upon completion of the above, the change is closed out by the affected groups. The CM tracking system is updated upon completion of this phase of work.

5.2.8. Beta Testing

Beta Testing is applicable for hardware and software changes. Beta testing will varify the change is working and no additional problems have been caused as a result of this change. The Beta Test group makes the decision when a new version of software or hardware change is to be released to users. The results of Beta Testing may initiate a new change which starts another cycle. Refer to Section 5.2.1, Source of Changes. Once Beta Testing is completed, the software and hardware enters the Release phase.

5.2.9. Release

Updated software is copied to the appropriate media and distributed along with updated documentation. At this point the change is closed and the Tracking System is updated. Documentation is to include installation instructions for the user.

Hardware changes are also released as kits to the user. A kit will contain all necessary parts and instructions for installing the modification. Release is responsible for obtaining necessary parts for the kit.

Release is also responsible for printing all necessary documentation changes and preparing the release of these to the user.

Full installation instructions will be prepared for any change and distributed from the release group.

Release group, upon actual release of a change, will update the baseline control documents for the appropriate HWCI or CPCI.

5.2.10. User

The user is responsible for installation of updated software and hardware upon receipt of same. Any difficulties encountered in installing updated software or a hardware modification kit is to be resolved with the group in charge of release.

The release group can, in turn, consult engineering for help in

resolving installation problems.

The user will complete and return to CM, the installation completed form (see Appendix C). CM, upon receipt of the installation completed, will update the master unit files to indicate change has been installed. If changes are not installed in a resonable amount of time, the CM system will notify the user that the change must be installed in order to maintain configuration control over the system. Necessary actions will be taken to alert appropriate command levels to ensure installation of deliquent changes.

5.3. Data Management

The Configuration Management Library will be AOTS's vehicle for data management. This library will be the medium to assure complete technical, administrative, and physical control of changes to software documents and software media. Configuration Management will be responsible for logging change requests as they are received for processing and will maintain the status of each change until it is completed. The data management control system will ensure that:

o   All released software and hardware elements are entered into the library.

o   The different program versions in the library are identified, controlled, and documented.

o   Back-ups for all masters are stored in an approved separate location.

o   No unauthorized modifications are made to the source or object programs or to documentation.

o   Procedures are enforced for controlling the flow of media and listings into and out of the library.

o   Access to the library is limited to authorized personnel only.

5.4. Deviation or Waiver

Hardware or Software shall not be delivered incorporating a known departure from documentation unless a request for deviation or waiver memo has been processed and approved in accordance with the requirements of this plan or unless otherwise permitted by contractually authorized personnel. Request for deviation on waiver shall be submitted in memo form to the AFHRL.

Definitions of deviation and waiver are given below:

o   Deviation

A deviation is the authorization to depart from a

particular requirement of a specification, drawing, or other document, for a specific number of units or a specific period of time.

o   Waiver

A waiver is the authorization to accept an item which, during production or after having been submitted for acceptance, is found to depart from specified requirements, but which is nevertheless considered suitable for use.

Standard DoD forms, as described in MIL-STD-480A, will be used for these functions.

6. CONFIGURATION AUTHENTICATION

Reconciliation and control of software and documentation are controlled according to the process outlined in Section 5. The controls make use of the various CM status accounting reports and CM identification lists. Control points are set up at various stages along the change processing system, to ensure that established procedures and approved controls are being followed.

o   Documentation

CM receives and logs copies of all documents before they are mailed for external distribution. Archives are kept under a secured environment.

o   Software

During software implementation testing, CM will control the movement of files from the Test Environment to the Distribution Environment. Only authorized changes will be permitted.

o   Hardware

CM and QA will check and verify the configuration before it is released to production.

7. CONFIGURATION STATUS ACCOUNTING

AOTS will initiate a configuration indexing and accounting system with the identification and recording of each item's approved configuration and then continuously track them to ensure that all relevant conditions of each approved change are observed and recorded. Configuration accounting will be used to maintain systematic records of configuration items and actions affecting configuration items, and also to generate reports for the Program Manager. To perform the status accounting function, CM systems will be performed on a PC using a DBMS system.

Continuous management of established baselines will be performed under guidance of MIL-STD-483, to maintain the status on all

proposed and approved changes, to both AOTS and vendor software/hardware.

The kinds of status accounting to be performed by Configuration Management are listed below.

7.1. Program Transaction Log

This automated reporting system tracks all correspondence between MDAC and AFHRL.

7.2. CCB Status Accounting

This reporting system includes CCB agendas and minutes, and change status reporting. This system also generates and tracks action items from the CCB.

7.3. Software Problem Report (SPR) Status Accounting

This reporting system will track the status of each SPR from start to completion.

7.4. CM Library Status Accounting

Lists of all AOTS documentation, their current versions and history of changes are kept. Distribution control lists are also maintained.

7.5. System Allocation Document

A System Allocation Document will be kept for both software and hardware configuration for the system site that will receive the deliverables:

   o   . Bergstrom AFB

7.6. Release Processing Status

   o   Release Work Log

This log documents the history of each release.

   o   CM Release Status Report

This report gives the status of all releases in process and completed releases.

7.7. Deviation and Waiver Reporting

The CM Deviation/Waiver Log documents the history of each Deviation or Waiver request.

8. INTERFACE MANAGEMENT

When Class 1 changes as described in Section 5.0 are proposed, MDAC AOTS Program Manager and AFHRL/OL-AK will accomplish the necessary coordination to develop all documentation required to support a Government decision on the change.

Each lead engineer for or AOTS subsystem manager will be the responsible individual to ensure that the interfaces with/to other AOTS subsystems are fully understood. This analysis will be included in the impact response to any change. Any subsystem that has an external interface to another Air Force system will also be determined and reported on in the impact statement.

9. CONFIGURATION AUDITS

9.1. Introduction

AOTS project will conduct Functional Configuration Audits (FCA) and Physical Configuration Audits (PCA) individually for the equipment CIs and the computer program CPCIs with a phased schedule. These audits will be conducted under the guidance of MIL-STD-1521A.

An audit plan will be prepared by the AOTS configuration management and approved by AFHRL/OL-AK 30 days prior to the audit. AOTS configuration managment will coordinate the schedule and agenda for each audit, ensure appropriate participation by our vendors and our subcontractors, and record and distribute the findings.

AOTS project will also performs software development reviews during the software life cycle.

9.2. Functional Configuration Audit (FCA)

The FCA will be a formal audit of a HWCI/CPCI to verify that the actual performance complies with the requirements of its development specification. The successful completion of the FCA will be a prerequisite leading to scheduling a PCA. The FCA will be conducted under guidance of MIL-STD-1521A, Appendix E. This audit normally will be conducted following completion of the formal Testing of a HWCI/CPCI. The FCA for a complex HWCI/CPCI may, when so specified by the Customer, be performed on an incremental basis during the development of the HWCI/CPCI and culminate with the completion of HWCI/CPCI Testing. The Contractor, in conducting the audit, will provide the necessary materials and data to enable the Customer to assure the following:

- o The testing of the specified HWCI/CPCI was accomplished with approved test procedures and validated data are sufficient to assure that HWCI/CPCI performance is in compliance with the requirements of the Development Specification;

o   Any differences between test data and specification
       requirements have been resolved and recorded in the
       minutes of the FCA;

o   Acknowledgment has been made a matter of record for
       partial accomplishment of the FCA for those HWCIs/CPCIs
       whose acceptance is contingent upon completion of
       integrated systems testing.

Following receipt of the FCA minutes, the AFHRL will establish
the adequacy of the AOTS's review performance through formal
Contracting Officer notification.

9.3. Physical Configuration Audit (PCA)

The PCA is the formal examination of the as-built version of a
HWCI/CPCI in comparison with its current technical documentation.
For hardware CIs, its purposes are to assure that the equipment
is fabricated in accordance with the current technical
documentation and that the documentation is complete and suitable
for use in production, for accepting subsequent production units,
and for support of operations, maintenance and logistics. For a
CPCI, the principal purpose is to verify that the product
specification is a complete and accurate technical description of
the CPCI being delivered. The "as-built" configuration of the CI
will be verified by the results of testing performed prior to
PCA. Successful completion of the PCA will establish the product
specifications as the PCI for subsequent configuration control at
the Product Baseline level. Upon successful completion of the
PCA, Product Baseline will be established and all subsequent
changes to the CI/CPCI will be processed against the Product
Specification.

The PCA will be conducted after successful completion of the
CI/CPCI SLT&E and prior to AFHRL Acceptance Tests and in general
guidance of MIL-STD-1521A, Appendix F. In performing the PCA,
AOTS will provide the materials and data necessary to enable the
AFHRL to ascertain the following:

o   The as-built configuration of the specified CI/CPCI
       correlates with the "As-Designed" record plus the
       "As-Planned" record for the item being audited or that
       all differences have been reconciled;

o   The acceptance testing requirements in the Product
       Specification for a CI/CPCI are adequate for acceptance
       by the Quality Assurance group.

o   Traceability is established to the Functional
       Configuration Audit (FCA) such that additional
       functional testing is shown to have been accomplished.

9.4. Software Development Reviews

AOTS Program Management will conduct the following software development reviews during development:

- o   Preliminary Design Review (PDR)

- o   Critical Design Review (CDR)

10. SUBCONTRACTOR/VENDOR CONTROL

AOTS is responsible for assuring that all software, documentation and programming materials procured from subcontractors conform to the prime AOTS contract requirements. Therefore, this plan shall be invoked on all commercial/ off-the-shelf subcontractors.

11. MAJOR MILESTONES

11.1. Configuration Management Program Phasing

To ensure the consistency of key Configuration Management activities so that the overall program schedule can be attained, an AOTS Engineering schedule is prepared and illustrates the major milestone and detail program schedules for each subsystem. Configuration Management activities are integral with the program objectives and are reflected in the scheduling of CM events consistent with the AOTS Program requirements. The establishment of baseline identifications are timed to meet these requirements. Configuration audits and reviews are scheduled to be consistent with AOTS engineering reviews and individual configuration item development schedules.

11.2. Configuration Management Major Milestones

The major milestones for Configuration Management are based on the phasing of program events that establish related milestones, or that identify the significant baselines planned for the AOTS Program. Major milestones are indicated in Block 12 and 13 of the CDRL and are illustrated in the Work Breakdown Schedule (WBS).

The AOTS Master Schedule will be used to indicate major Configuration/Program Management milestones. This schedule will be used for Configuration Management Planning but is not required to be a part of this plan.

Appendix A

List of Acronyms, Abbreviations, and Initials

APPENDIX A - LIST OF ACRONYMS, ABREV., AND INITIALS

ITEM	DESCRIPTION
AFHRL	Air Force Human Resources Laboratory
AOTS	Advanced On-The-Job Training System
CBTS	Computer Based Training Systems
CCB	Configuration Control Board
CCF	Configuration Control Form
CDR	Critical Design Review
CLIN	Contract Line Item Number
CDRL	Contract Data Requirements List
CM	Configuration Management
CMP	Configuration Management Plan
CPC	Computer Program Component
CPCI	Computer Program Configuration Item
CPDS	Computer Program Development Spec
CPTR	Computer Program Test Report
CSDM	Computer System Diagnostic Manual
CSOM	Computer System Operator's Manual
CSTP	Computer Software Test Plan
DBDD	Data Base Design Document
DID	Data Item Description
DOD	Department of Defense
DODISS	Department of Defense Index of Specifications and Standards
ECP	Engineering Change Proposal
FCA	Functional Configuration Audit
FSED	Full Scale Engineering Development
FSM	Firmware Support Manual
GFE	Government Furnished Equipment
GFS	Government Furnished Software
HOL	Higher Order Language
HWCI	Hardware Configuration Item
IDD	Interface Design Document
IRS	Interface Requirements Specification
MTP	Master Test Plan/Program Test Plan
PCA	Physical Configuration Audit
PDR	Preliminary Design Review
PR	Problem Report
PROM	Programmable Read-Only Memory
QAP	Quality Assurance Plan
QAR	Quality Assessment Report
RFP	Request for Proposal
ROM	Read-Only Memory
SCP	Software Change Proposal
SCR	Specification Change Notice
SDF	Software Development File

ITEM	DESCRIPTION
SDP	Software Development Plan
SDR	Software Discrepancy Report
SDRL	Seller Data Requirements List
SEMP	Software Engineering Management Plan
SOW	Statement of Work
SPM	Software Programmer's Manual
SPR	Software Preliminary Design Review
SPS	Software Product Specification
SRS	Software Requirements Specification
STR	Software Trouble Report
SUM	Software System User's Manual
VDD	Version Description Document
WBS	Work Breakdown Structure

Appendix B

MDAC Control Procedure 2.001
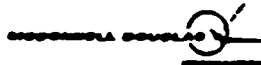
SUBJECT: CONFIGURATION MANAGEMENT, DEPARTMENT OF
DEFENSE APPLICATIONS

A. SUMMARY:

1. Configuration Management applies
   to all Configuration Items procured
   from MCAIR by Department of Defense.
   The application of Configuration
   Management will be carefully tai-
   lored to be consistent with the
   quantity, size, scope, stage of
   life cycle, nature and complexity
   of the Configuration Items involved
   and the appropriate contract re-
   quirements.

B. APPLICABLE TO:

   Customer Contracts Division
   Engineering Divisions
   Manufacturing Division
   Material Division
   Product Support Division
   Quality Assurance Division

C. DEFINITIONS:

1. Baselines: Customer approved tech-
   nical descriptions form the base-
   lines of configuration management
   (CM) and provide the basis for con-
   figuration control and status
   accounting.

   a. Functional Baseline: Documented
      by a system description (per-
      formance specification) which
      describes:

      (1) all necessary functional
          characteristics,

      (2) interface characteristics
          of the system with asso-
          ciated systems or items,

      (3) tests required to demon-
          strate achievement of spec-
          ified functional character-
          istics, and

   (4) design constraints such as
       limiting envelope dimen-
       sions, component standardi-
       zation, use of inventory
       items and integrated logis-
       tics support policies.

       NOTE: For systems to be
       defined for development
       under contract at customer
       expense, this baseline is
       established by customer
       issuance of a system speci-
       fication following approval
       to initiate engineering or
       operational development.

   b. Allocated Baseline: Established
      to govern the development of
      constituent Configuration Items
      (CIs) forming a system. Each CI
      is defined by a performance
      specification which:

      (1) defines CI functional
          characteristics including
          those allocated from the
          system specification,

      (2) delineates interface re-
          quirements of CIs,

      (3) establishes criteria to
          demonstrate that required
          CI performance has been
          achieved, and

      (4) establishes design con-
          straints.

   c. Product Baseline: Established
      for each CI upon completion of
      the audit of the physical and
      functional characteristics of
      the item. For CIs developed as
      a result of Company funded In-
      dependent Research and Develop-
      ment (IRAD) effort, this

C. DEFINITIONS: (Cont'd)

baseline is established after completion of any tests required to demonstrate the item's suitability for customer procurement. The product baseline is defined by specifications, including referenced design drawings which describe:

(1) physical characteristics required to manufacture and reprocure the CI,

(2) the selected functional characteristics of the CI designated for product acceptance testing, and

(3) the production acceptance tests.

2. **Configuration**: A collection of a product's descriptive and governing characteristics.

   a. In functional terms, the performance it is expected to achieve.

   b. In physical terms, what it should look like and consist of.

3. <u>Configuration Control Board (CCB)</u>: A board appointed by the Program Manager for a given program to review all proposed specification and design changes for necessity, cost and effectivity. The CCB consists of the Configuration Manager and other permanent members from Customer Contracts, Engineering, Manufacturing, Material, Product Support and Quality Assurance Divisions, and program management. Other organizations will be represented as required for support. The CCB is a nonvoting board with the chairman responsible for final decision on all CCB actions. Scheduled meetings will be held and the board may be convened by the Chairman for special sessions as required.

4. <u>Configuration Identification</u>: The current approved or conditionally approved technical documentation for a CI as set forth in specifications, drawings and associated lists, and documents referenced therein.

5. <u>Configuration Item (CI)</u>: An aggregation of hardware/software, or any of its discrete portions, which satisfies an end use function and is designated by the government for CM. During development and initial production, CIs are only those specification items that are specifically referred to in the contract. During the operation and maintenance period, any repairable item designated for separate procurement is a CI.

6. <u>Configuration Management (CM)</u>: A discipline applying technical and administrative direction and surveillance to:

   a. identify and document the functional and physical characteristics of a CI,

   b. control changes to those characteristics, and

   c. record and report change processing and implementation status.

7. <u>Configuration Status Accounting (CSA)</u>: The recording and reporting of the information that is needed to manage configuration effectively, including a listing of the approved configuration identification, the status of proposed changes to configuration, and the implementation status of approved changes.

8. <u>Functional Configuration Audit (FCA)</u>: A means of validating that development of a CI has been completed satisfactorily. FCAs shall be conducted to assure that:

C. DEFINITIONS: (Cont'd)

    a. test data for a CI verify the item has achieved the performance specified in its functional or allocated configuration identification, and

    b. technical documentation is maintained describing the physical configuration of each unit of the CI for which test data is verified.

9. Functional Configuration Identification (FCI): Current approved technical documentation for a CI which prescribes:

    a. all necessary functional characteristics;

    b. tests required to demonstrate achievement of specified functional characteristics;

    c. necessary interface characteristics with associated CIs;

    d. lower level CIs, if any; and

    e. applicable design constraints, if any.

10. Phase:

    a. Definition Phase: The formulative stage in the evolution of a system during which major trade-offs are accomplished and the need for a capability is translated into a system specification and into performance requirements for individual CIs as required by Department of Defense (DoD).

    b. Acquisition Phase: The period in the life cycle of an operational system commencing with customer issuance of an updated system specification (end of definition phase). During this phase, the system is designed and developed; its identification documentation is expanded and reviewed until completed and formally approved. Acquisition phase continues until the acceptance by the customer of the last operating unit in a series. Development portion of the acquisition phase is concluded when the specified requirements have been demonstrated through Category II testing and all required updating changes resulting from the testing have been identified, approved and placed on procurement, whichever occurs later.

    c. Operational Phase: The phase for any single CI beginning with the delivery of the first unit of the CI to be accepted for the operational inventory.

11. Physical Configuration Audit (PCA): A means of establishing the Product Configuration Identification (PCI) used initially for production and acceptance of the units of a CI. DoD will assure (through PCAs) that:

    a. the "as built" configuration of a unit of a CI, selected jointly by the DoD component and MCAIR, matches the same unit's PCI as proposed by MCAIR, or that differences are reconciled; and

    b. the acceptance test requirements prescribed by the documentation are adequate for acceptance of production units of a CI by Quality Assurance Division functions.

12. Product Configuration Identification (PCI): The current approved or conditionally approved technical documentation which defines the configuration of a CI during the production, operation, maintenance and logistic support phases of its life cycle, and which prescribes:

. DEFINITIONS: (Cont'd)

   a. all necessary physical or "form, fit and function" characteristics of a CI;

   b. the selected functional characteristics designated for production acceptance testing; and

   c. the production acceptance tests.

13. Specifications:

   a. System Specification: States the technical and mission requirements of the system as an entity. These specifications include:

     (1) necessary performance requirements, including test provisions to assure that all requirements are achieved;

     (2) essential physical constraints; and

     (3) requirements for specific functional areas, interfaces between functional areas, interfaces with other systems, and application of any known specific existing equipment.

   b. Development Specification: States all necessary requirements in terms of performance. These requirements include:

     (1) essential physical constraints for the development of CIs, other than systems; and

     (2) functional characteristics and tests required to demonstrate achievement of those characteristics.

   c. Product Specification: States functional requirements and physical characteristics necessary to procure either CIs requiring "form, fit and function" interchangeability or identical items within specification tolerances. The specifications specify all the quality assurance provisions necessary to adequately demonstrate achievement of the specified requirements and characteristics.

14. System: A composite of subsystems, assemblies, skills and techniques capable of performing and/or supporting an operational role. A complete system includes related facilities, items, material, services and personnel required for its operation to the degree that it can be considered a self-sufficient item in its intended operational and/or support environment.

D. REGULATIONS:

1. CM will be established as prescribed in DoD Directive 5010.19, Configuration Management and DoD Instruction 5010.21, Configuration Management Implementation Guidance.

2. CM will satisfy MIL-STD-480 and/or MIL-STD-481, Configuration Control - Engineering Changes, Deviations and Waivers; use the standard data elements of MIL-STD-482, Configuration Status Accounting Data Elements and Related Features; and satisfy MIL-STD-490, Specification Practices, and MIL-STD-83490, Specifications, Types and Forms, as contractually invoked.

3. During the definition phase, CM will be accomplished at system level. Formal CM will be implemented early in the definition phase when the system specification has been contractually imposed on MCAIR.

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D. REGULATIONS: (Cont'd)

4. During the acquisition phase, emphasis will be on configuration control and status accounting. CM is expanded to include accomplishment at the CI level.

5. With the beginning of the operational phase, formal CSA reporting to the DoD component tracks the product baseline as well as other specific requirements imposed by the cognizant customer agency and MCAIR management.

6. The Configuration Manager is responsible for ensuring that configuration identification, control and accounting are implemented in compliance with contract requirements. Additionally, he shall be responsible for administration of the CCB.

E. PROCEDURE I: PROGRAM IMPLEMENTATION

Engineering Divisions

1. Receive DoD request for expansion of system specification or determine that MCAIR preparation of system specification will enhance program sales effort in support of an unsolicited program.

Customer Contracts Division

2. Receive notification from customer agency via a Request for Proposal (RFP), contract change order, statement of work, etc., that MCAIR is assigned responsibility to update and expand a system specification (beginning of Phase IA of definition phase).

3. Document authorization to proceed with expansion of system specification and forward to the designated program or engineering manager.

Program Manager

4. Coordinate the appointment of a Configuration Manager with Manager Contract Management Systems.

5. Appoint members to CCB and designate chairman.

Engineering Divisions

6. Prepare or update system specification utilizing customer supplied system oriented documentation submitted by Customer Contracts Division and forward to Configuration Manager.

Configuration Manager

7. Review information, record changes and update CM records and forward to Customer Contracts Division.

Customer Contracts Division

8. Submit system specification to appropriate requesting agency for approval or joint resolution; refer results with implementation directions regarding designated CIs to Configuration Manager (beginning of Phase IB, definition phase and thus establishing functional baseline).

Engineering Division

9. Prepare updated system specification based on that version received at the start of Phase IB. Prepare development specifications for CIs, critical item specifications when required and specification tree to reflect specific program specification activity proposed or required for each program. Submit package to Configuration Manager.

E. PROCEDURE I: PROGRAM IMPLEMENTATION
(Cont'd)

Configuration Manager

10. Monitor specification preparation activity, collect and document CM requirements and establish traceability of Customer requested changes to the affected system specification received at start of Phase IB.

11. Review and determine long-range specification programs; coordinate expanded specification program per contract requirements.

12. Ensure change control traceability.

13. Coordinate the analysis of CM requirements with respect to applicability to subcontractors and assure release of proper definition of same for incorporation in MAC 877 (Series), PURCHASE ORDER, or RFP.

14. Review information and related change control documentation (Engineering Change Proposal (ECP) and related Specification Change Notices) and schedule a meeting of the CCB.

CCB

15. Review and approve updated system specification and related change documentation. Forward to Customer Contracts Division.

Customer Contracts Division

16. Accumulate inputs from all participating project areas to satisfy requirements of RFP; submit proposal to cognizant requesting agency, completing Phase IB of definition phase.

Configuration Manager

17. Coordinate and expand activities of participating project areas to further refine CM functions, as required, to enable implementation as proposed in Phase IB (Phase IC of definition phase).

Customer Contracts Division

18. Receive award for Phase II contract (acquisition phase); review contract for funding and scope of work.

NOTE: Customer approval of those development specifications submitted as part of the proposal, or award of Phase II contract establishes the allocated baseline.

19. Issue MAC 754, JOB ORDER, reflecting necessary funding and contractual authorizations for scheduled implementation and expenditure of time and material as prescribed in CP 7.101.

Engineering Division

20. Complete detail design and prepare necessary production drawings.

21. Prepare product specifications considering negotiated trade-offs from design reviews.

22. Support CM requirements throughout operational phase and production. Production items will reflect the requirements of PCI documentation, plus any approved changes thereto.

Manufacturing Division

23. Receive drawings from Engineering Division; follow up as necessary to assure that drawings and revisions thereto are released on schedule.

24. Translate drawings into shop work instructions for manufacture of required tools, parts and assemblies.

25. Maintain a detailed drawing configuration record for traceability and audit of configuration for each drawing.

26. Maintain an "as planned" bill of material and audit to the "as designed" bill of material as required to assure equivalence.

NO   CP 2.001
PAGE   7 of 8
DATE   8 Dec 69

E. PROCEDURE I: **PROGRAM IMPLEMENTATION**
(Cont'd)

27. Maintain historical record of shop work instruction releases to verify manufacture of proper configuration for effectivity and schedule.

28. Manufacture hardware and obtain Quality Assurance Division certification of configuration and quality.

29. Control installation of CI serialized items by effectivity and assigned serial numbers.

30. Participate in configuration reviews and audits.

Material Division

31. Requisition and procure the required configuration on all parts, systems, and assemblies from suppliers, in accordance with CP 6.105 and CP 6.106; and approved in accordance with CP 6.101.

32. Impose on all suppliers, CM practices and requirements including supplier control and certification of CIs for conformance to established baselines, through PURCHASE ORDER and clauses.

Quality Assurance Division

33. Perform continuous hardware audit to ensure the "as built" configuration conforms to the "as designed" configuration.

34. Verify and document the first incorporation of each Class I engineering change.

35. Verify and record serial numbers of items selected for serialized accounting.

36. Provide and maintain Quality Assurance records, selected items configuration log and Class I change

incorporation records as an integrated record system in which each CI is visible and auditable.

37. Provide integrated record system data as a primary input for PCA, supplemented by the product specification and top level engineering drawings and change documents referenced therein, from engineering files for hardware verification. Drawings subindentured to top level drawings should be available in file in case they are needed.

38. Assure conformance of subcontractor and supplier to CM requirements in PURCHASE ORDER.

Product Support Division

39. Maintain, for cognizant requesting agency, CM serial number records of items selected for serialized accounting.

40. Prepare and submit data to introduce items selected by the cognizant requesting agency for serialized accounting, in accordance with contract requirements.

41. Submit data relating serial numbers of each selected item to its next higher assembly serial number and the operating time for each item, in accordance with contract requirements.

42. Prepare and maintain other documentation required to provide logistics support to the system or system segment being procured by DoD.

43. Coordinate retrofit programs.

44. Prepare and coordinate ECP schedules and milestone charts, Integrated Logistics Support (ILS) documents and ECP supporting exhibits for ILS purposes.

Version 1.01

E. PROCEDURE I: PROGRAM IMPLEMENTATION
(Cont'd)

45. Provide and maintain CSA data and
reports in accordance with CM
requirements of the contract.

F. REFERENCES:

1. General

a. CP 6.101, Routing and Approval
of Purchase Requisitions
b. CP 6.105, Purchase Requisitions
c. CP 6.106, Purchase Orders and
Purchase Change Orders
d. CP 7.101, Job Orders
e. DoD Directive 5010.19, Config-
uration Management
f. DoD Instruction 5010.21, Config-
uration Management Implementa-
tion Guidance

g. MIL-STD-480, Configuration Con-
trol - Engineering Changes, De-
viations and Waivers
h. MIL-STD-481, Configuration Con-
trol - Engineering Changes, De-
viations and Waivers (Short
Form)
i. MIL-STD-482, Configuration Sta-
tus Accounting Data Elements
and Related Features
j. MIL-STD-490, Specification
Practices
k. MIL-STD-83490, Specifications,
Types and Forms

2. Forms

a. MAC 754, Job Order
b. MAC 877 (Series), Purchase Order

A. L. Boyd
A. L. Boyd
Vice President
Fiscal Management

Appendix C

AOTS Configuration Management and other Forms

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AOTS UNIQUE FORMS

Form Number	Description	Rev.	Date
AOTS0010-1	AOTS Project Specification Change Memo	---	8/26/86
AOTS0010-4	AOTS Estimate Work Sheet Summary	---	9/22/86
AOTS0010-5	AOTS Estimate Subsystem Work Sheet	---	9/22/86
AOTS0010-6	AOTS Configuration Control Form	---	9/22/86
AOTS0010-8	Configuration Item Development Record	---	9/23/86
AOTS0010-10	Hardware Configuration Item	---	9/24/86
AOTS0010-11	Engineering Change Classification Checklist	---	9/23/86
AOTS0010-12	Risk Analysis Worksheet	---	10/1/86
AOTS0010-13	Risk Analysis Worksheet Summary	---	9/25/86
AOTS0010-14	Engineering Release Form	---	10/1/86
AOTS0010-15	CM Control Log	---	10/1/86
AOTS0010-16	Computer Program Configuration Item	---	10/2/86
AOTS0010-17	CPCI Continuation Form	---	10/2/86
AOTS0010-18	Change History Continuation Form	---	10/2/86
AOTS0010-19	Configuration Item Audit and Review Record	---	10/2/86
AOTS0100-1	AOTS Maintenance Action Report	---	8/25/86
AOTS0100-4	Software Problem Report	---	8/25/86

GOVERNMENT FORMS USED BY AOTS

DD 1693   Engineering Change Proposal (Short Form)   MIL-STD-481A
                                                       DOD-STD-480A

-OR-   DD1692-1 Engineering Change Proposal (long form)
                                                       DOD-STD-480A

DD 1694   Request for deviation/waiver   MIL-STD-481A
                                                       DOD-STD-480A

AFSC 223   Advanced Change/Study Notice (ACSN)   MIL-STD-483A

none specified
           Contract Change Proposal/Task Change Proposal
                                                       MIL-STD-483A

DD 1696   Specification Change Notice (when spec is revised)
                                                       MIL-STD-483A

(

AOTS PROJECT SPECIFICATION CHANGE MEMO

| No. _____
| Date: ___/___/___

| From:_____   Telephone #:_____

| Affected Specs: Remarks:
| [] A Spec 70S647000   _____
| [] B1 Spec #_____   _____
| [] B5 Spec #_____   _____
| [] C5 Spec #_____   _____
| [] Other document(s): _____   _____

| Affected software: _____

| Affected hardware: _____

| Description of change: _____

| _____

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| (Use additional pages, as required, to describe change.)

| CHANGE CLASSIFICATION (Set by Configuration Control):
| [] Class 1   [] Class 2   [] Other: _____

| APPROVAL OF CHANGE: [] Approved   [] Disapproved

| _____   _____   _____
| Subsystem Manager   MDAC Configuration   MDAC Program Manager
| Control Manager

| AF APPROVAL: [] Approved   [] Disapproved

| _____   _____   _____
| AF Configuration ControlAF Technical   AF Program Manager

| Date for Specs to be updated by: ___/___/___ for:_____

| _____

| _____

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AOTS ESTIMATE WORK SHEET SUMMARY

```
| AOTS CM Log Number: _____ | Date: __/__/__ |
|-------------------------------------------------------------|
| Affected Specification(s): _____ |
| _____ |
|-------------------------------------------------------------|
| Impact statement: _____ |
| _____ |
| _____ |
| _____ |
|-------------------------------------------------------------|
| ESTIMATE SECTION: (Use additional pages as necessary)       |
|-------------------------------------------------------------|
| Management Subsystem:        _____ MHrs  $_____     |
| Schedule Impact: _____  |
| _____ |
| _____ |
|-------------------------------------------------------------|
| Evaluation Subsystem:        _____ MHrs  $_____     |
| Schedule Impact: _____  |
| _____ |
| _____ |
|-------------------------------------------------------------|
| TDDS Subsystem:              _____ MHrs  $_____     |
| Schedule Impact: _____  |
| _____ |
| _____ |
|-------------------------------------------------------------|
| Personnel Subsystem:         _____ MHrs  $_____     |
| Schedule Impact: _____  |
| _____ |
| _____ |
|-------------------------------------------------------------|
| IST Support:                 _____ MHrs  $_____     |
| Schedule Impact: _____  |
| _____ |
| _____ |
|-------------------------------------------------------------|
| Computer Support Subsystem: _____ MHrs  $_____      |
| Schedule Impact: _____  |
| _____ |
| Spread of labor per subsystem CPCI:                         |
|                                                             |
| Management: _____  |
| _____ |
| Evaluation: _____  |
| _____ |
| TDDS: _____  |
| _____ |
| Support: _____  |
| _____ |
| _____ |
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AOTS ESTIMATE SUBSYSTEM WORK SHEET

| AOTS CM Log Number: _____ | Date: __/__/__ |

Subsystem: _____

Impact: _____
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Manpower estimates: _____
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Schedule changes: _____
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Remarks: _____
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Prepared by: _____ Date: __/__/__

AOTS CONFIGURATION CONTROL FORM

```
| CM Log No. _____ |        Date: ___/___/__   |
| Originator (or source): _____ |
|--------------------------------------------------------|
| [] Class 1  [] Class 2  [] Other _____ |
| Impact statement: _____ |
| _____ |
| _____ |
| _____ |
|--------------------------------------------------------|
| Change Source: _____ |
| Affected:                                     Version: |
| Specification(s): _____ _____ |
| HWCI(s): _____ _____ |
| CPCI(s): _____ _____ |
| Affected Baseline Version: _____ Beta Version: _____ |
|--------------------------------------------------------|
| Risk Analysis statement: _____ |
| _____ |
| _____ |
| _____ |
| _____ |
|--------------------------------------------------------|
| Project Impacts: 1. Cost: _____ MHrs  $ _____ (Material) |
| Schedule: _____ |
|                                                        |
| (Attach supporting information to document cost and schedule |
|  impacts.)                                             |
|--------------------------------------------------------|
| APPROVALS:                                             |
|--------------------------------------------------------|
| [] Approved [] Disapproved - Implement Other: _____ |
|                            (in scope only change)      |
| MDAC CCB PM: _____ AF CCB PM: _____ |
|              Date: ___/___/__              Date: ___/___/__ |
|--------------------------------------------------------|
| [] Approved [] Disapproved Implement Class 2 (in scope) change |
| MDAC CCB PM: _____ AF CCB PM: _____ |
|              Date: ___/___/__              Date: ___/___/__ |
|--------------------------------------------------------|
| [] Approved [] Disapproved - Recommend Implementing Class 1 |
|                            (out of scope) Change       |
| MDAC CCB PM: _____ AF CCB PM: _____ |
|              Date: ___/___/__              Date: ___/___/__ |
| If approved, Engineering Change Proposal (ECP) must be  |
| prepared and forwarded to AOTS AF Contracting Officer for |
| approval prior to proceeding.  Date sent to MDAC CO for ECP |
| preparations ___/___/__  Date sent to AF CO: ___/___/__ |
| [] Approved [] Disapproved by Air Force Contracting Officer |
| Date: ___/___/__  MDAC Authorization (charge number:   |
|                                                        |
|--------------------------------------------------------|
| Date sent to engineering for implementation: ___/___/__ |
| Date for release of change: ___/___/__ in version: _____ |
| Date CM Log Number cleared as action item: ___/___/__  |
|--------------------------------------------------------|
| Remarks: _____ |
|                                                        |
```

AOTS CONFIGURATION CHANGE REQUEST

| CM Log No. _____ | Date: ___/___/___ |

Originator: _____

Description of proposed change: _____
_____
_____
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Reason for recommending change. _____
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Affected areas of AOTS Subsystems: _____
Management Subsystem: _____

Evaluation Subsystem: _____

TDDS Subsystem: _____

Personnel Subsystem: _____

Computer Support Subsystem: _____
_____
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CCB actions: _____
_____

Baseline version: _____ Beta version: _____

[] Approved to proceed [] Disapproved (return to file and copy
                                        originator)
Authorized by: _____ Date: ___/___/___

CONFIGURATION ITEM DEVELOPMENT RECORD - PART 1

Nomenclature:

Development Specification:
Number and Date:
Authentication Date:

Configuration Item:
Identification:

Preliminary Design Review Date:	Critical Design Review Date:
Functional Configuration Audit - Schedule Date:	Physical Configuration Audit - Schedule Date:

Configuration Item Qualification Scheduled Date:

Qualification Test Report:

Contractor:	Contract No.

CONFIGURATION ITEM DEVELOPMENT RECORD PART 2

Configuration Item Specification		Impact of Changes on Related CIs			
SCN	ECP	Sepecification/Document Title and Number	SCN	ECP	CONTR

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HARDWARE CONFIGURATION ITEM

CI ID#: _____	Location: _____
Unit ID#: _____	Unit location: _____
Part Number: _____	
Serial Number: _____	Custodian: _____
Revision level: _____	Remarks: _____
Date: ___/___/___	_____
Revision Change: _____	_____

CI Description: _____

Specification #: _____ Date: ___/___/___ Rev: _____

Subassembly data

ID #	Location	Description	Rev.	Remarks

Change History: _____

_____

Sheet ___ of ___ | Issue: ___/___/___ | By: _____

ENGINEERING CHANGE CLASSIFICATION CHECKLIST

CI: _____ CM Log No. _____

Part Number: _____

Description: _____

YES	NO	CRITERIA (NOT LIMITED TO THE FOLLOWING)
		1. Are you recommending retrofit?
		2. Does this correct a deficiency (specs or rqt)
		3. Does this change any manuals or documents
		a. Reference Manual?
		b. Specification?
		c. Vendor manuals or data?
		d. Vendor manuals or data?
		4. Would software will be affected?
		5. Is interchangeability, substitutability or replaceability affected?
		6. Is Safety affected?
		7. Are external interfaces affected?
		8. Is training affected?
		9.
		10.
		11.
		12.

Remarks: _____

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RISK ANALYSIS WORKSHEET SUMMARY

| AOTS CM Log Number: _____ |

Effected Areas:
[] SOW	[] Contract	[] Proposal
[] Cost	[] Fee	[] Cost to Gov't
[] Delivery Schedule	[] Development Schedule	
[] Documentation	[] Specifications	[] Operations
[] Safety	[] External Interfaces	
[] Manpower level	[] Skill level	[] Training

Contractor Position: _____

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Analysis performed by: _____ Date ___/___/___

Air Force Position: _____

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Analysis performed by: _____ Date ___/___/___

RISK ANALYSIS WORKSHEET

| AOTS CM Log Number: _____

Prepared by:

[] Air Force [] Contractor: _____

Effected Areas:

[] SOW	[] Contract	[] Proposal
[] Cost	[] Fee	[] Cost to Gov't
[] Delivery Schedule	[] Development Schedule	
[] Documentation	[] Specifications	[] Operations
[] Safety	[] External Interfaces	
[] Manpower level	[] Skill level	[] Training

Position: _____

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Analysis performed by: _____ Date ___/___/___

ENGINEERING RELEASE FORM

```
-----------------------------------------------------------------
| AOTS CM Log No. _____    | Release Date: ___/___/___     |
|-----------------------------------------------------------------|
| Affected CPCI: _____ |
| Affected HWCI: _____ |
| Affected Specification(s): _____ |
| Affected Document(s): _____ |
|-----------------------------------------------------------------|
| Description of work: _____ |
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|-----------------------------------------------------------------|
| BUDGET:  [] Single Task  [] Multiple Tasks (Qty: ____)          |
| Authorized manhours: _____     Material $_____              |
| Authorized charge number(s) for manpower per task:             |
| Task 1 _____ MHrs: ____ CAM: _____        |
| Task 2 _____ MHrs: ____ CAM: _____        |
| Task 3 _____ MHrs: ____ CAM: _____        |
| Authorized charge number(s) for material: _____        |
| _____ |
|-----------------------------------------------------------------|
| Work assigned to: _____ Date: ___/___/___           |
| Assigned Supervisor: _____ Date: ___/___/___           |
|-----------------------------------------------------------------|
|                                   Estimated      Actual         |
| Date work is to be completed:     ___/___/___   ___/___/___     |
| Date testing to start:            ___/___/___   ___/___/___     |
| Date Beta testing to start:       ___/___/___   ___/___/___     |
| Estimated Date to formal release: ___/___/___   ___/___/___     |
|-----------------------------------------------------------------|
| The attached schedule shall be used for this effort.           |
|-----------------------------------------------------------------|
| Remarks: _____ |
| _____ |
| _____ |
| _____ |
| _____ |
|-----------------------------------------------------------------|
| APPROVALS: Charge Numbers: _____ ___/___/___         |
|                                                                 |
| For implementation: _____ ___/___/___        |
|                   AOTS Program Manager                          |
-----------------------------------------------------------------
```

COMPUTER PROGRAM CONFIGURATION ITEM

CPCI No. and Nomenclature: _____

_____
_____

Software Requirements Specification: _____
Date of Issue: ___/___/___   Rev. No. _____

Software Top Level Design Document: _____
Date of Issue: ___/___/___   Rev. No. _____

Software Test Plan: _____
Date of Issue ___/___/___   Rev. No. _____

Software Detailed Design Document: _____
Date of Issue: ___/___/___   Rev. No. _____

Program/Subroutine names used in this CPCI:

NAME	Date	Rev.	Description
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
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Sheet ___ of ___	Issued by: _____ Date: _____

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CPCI CONTINUATION FORM

| CPCI No. _____ | Issue date: ___/___/___ |

Nomenclature:
_____
_____

Program/Subroutine names used in this CPCI:

NAME	Date	Rev.	Description
_____	_____	_____	_____
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| Sheet ___ of ___ | Issued by: _____ Date: _____ |

CHANGE HISTORY CONTINUATION FORM

[] CI # _____   [] CPCI # _____

Nomenclature:
_____
_____

Change History: _____

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Sheet ___ of ___ | Issued by: _____ Date: _____

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CONFIGURATION ITEM AUDIT AND REVIEW RECORD

```
| [] CI # _____    [] CPCI # _____ |
|------------------------------------------------------------------|
| Nomenclature: _____   |
|               _____   |
|               _____   |
|------------------------------------------------------------------|
| Specification Review                                             |
| Date: ___/___/___                                                |
|------------------------------------------------------------------|
| Preliminary Design Review                                        |
| Date: ___/___/___                                                |
|------------------------------------------------------------------|
| Critical Design Review                                           |
| Date: ___/___/___                                                |
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|------------------------------------------------------------------|
| Test Readiness Review                                            |
| Date: ___/___/___                                                |
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|------------------------------------------------------------------|
| Functional Configuration Audit                                   |
|                                                                  |
|         By: _____ Date: _____    |
|------------------------------------------------------------------|
| Physical Configuration Audit                                     |
|                                                                  |
|         By: _____ Date: _____    |
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| Applicable Specification(s)                                      |
|                                                                  |
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| Applicable Documentation                                         |
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|                                                                  |
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|------------------------------------------------------------------|
| Remarks: _____   |
|          _____   |
|          _____   |
```

AOTS MAINTENANCE ACTION REPORT FORM

LOG NUMBER: _____   DATE: ___/___/___   LOCATION: _____

NAME: _____   TIME: _____

TYPE OF EQUIPMENT: [] Zenith Z-248 PC   [] Dot Matrix Printer
[] HP Laserjet+   [] Color printer   [] Data Tablet 11 X 11"
[] IBM PC AT XT   [] Infotron Comm   [] Data Tablet 20 X 20"
[] DEC VAX 8600   [] Other: _____

Serial Number: _____   Other ID#: _____

Description of failure: _____

_____

_____

_____

Problem reported to (responsible for maintenance): _____

Date: ___/___/___   Time: _____   ID: _____

REPAIR ACTION: Date maintenance started: ___/___/___   Time: _____

Date finished: ___/___/___   Time: _____

[] On-Site [] Off-Site   Name: _____

Organization: _____

Corrective Action: _____

_____

_____

_____

_____

Time Taken to repair: _____   Time awaiting parts: _____

Is the configuration of the item changed during maintenance? [] Yes []
If yes, describe and document revision level changes and effected items

_____

_____

Acceptance of repaired item name and signature: _____

Certified by (name and signature): _____

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SOFTWARE PROBLEM REPORT

Log No. _____   Date: ___/___/___   Time: _____

Name: _____ Location: _____

Telephone number: _____

Hardware being used when problem was detected: [] Z248 [] 8600
[] Other: _____

Description of problem: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____
===
Problem assigned to: _____ Date: ___/___/___

Classification: [] Bug [] User Error [] Class 1 (Enhancement)

Priority: [] Immediate [] Delayed [] Workaround [] Other: _____

Corrective action: _____

_____

_____

_____

Date work completed: ___/___/___

CM: [] CM Entered [] CCB approved [] CM Action: _____

Corrective action approval:

_____   _____   _____
Software Manager   Configuration Mgt.   Program Manager

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CM CONTROL LOG

Log Number	Date	Type	Originator	Affected CI/CPCI	Dates			CCB AP.DISAP.	CCB Scope?	To CO	To CM Plan.	To Impl.	Beta Rel. #	Beta R. Date	Final Rel.	Close Log #
					Ana.St.	Summary	To CCB									

Page ___ of ___   Log. No. ___   Date Started: __/__/__   Date ended: __/__/__   Maintained by: _____

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Appendix D

Hardware Configuration Item ID Schema

Configuration Item Description	ID #	UNIT ID#	Location	Serial Number	REMARKS
Z-248 Personal Computer	Z-248-A1	-A 1	BLDG 1808		
	Z-248-A1	-A 2	BLDG 1808		
	Z-248-A1	-A 3	BLDG 1808		
	Z-248-A1	-A 4	BLDG 1808		
	Z-248-A1	-A 5	BLDG 1808		
	Z-248-A1	-A 6	BLDG 1808		
	Z-248-A1	-A 7	BLDG 1808		
	Z-248-A1	-A 8	BLDG 1808		
	Z-248-A1	-A 9	BLDG 1808		
	Z-248-A1	-A 10	BLDG 1808		
	Z-248-A1	-A 11	BLDG 1808		
	Z-248-A1	-A 12	BLDG 1808		
	Z-248-A1	-A 13	BLDG 1808		
	Z-248-A1	-A 14	BLDG 1808		
	Z-248-A1	-A 15	BLDG 1808		
	Z-248-A1	-A 16	BLDG 1808		
	Z-248-A1	-A 17	BLDG 1808		
	Z-248-A1	-A 18	BLDG 1808		
	Z-248-A1	-A 19			
	Z-248-A1	-A 20			
	Z-248-A1	-A 21			
	Z-248-A1	-A 22	T2		
	Z-248-A1	-A 23			
	Z-248-A1	-A 24			
	Z-248-A1	-A 25			
	Z-248-A1	-A 26	BLDG 428		

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Configuration Item Description	ID #	UNIT ID#	Location	Serial Number	REMARKS
	Z-248-A1	-A 27	BLDG 428		
	Z-248-A1	-A 28	BLDG 428		
	Z-248-A1	-A 29	BLDG 428		
	Z-248-A1	-A 30	BLDG 428		
	Z-248-A1	-A 31	BLDG 428		
	Z-248-A1	-A 32	BLDG 428		
	Z-248-A1	-A 33	BLDG 428		
	Z-248-A1	-A 34	BLDG 428		
	Z-248-A1	-A 35	BLDG 428		
	Z-248-A1	-A 36	BLDG 428		
	Z-248-A1	-A 37			Reserved for phase III & TDDS
	Z-248-A1	-A 38			Reserved for phase III & TDDS
	Z-248-A1	-A 39			Reserved for phase III & TDDS
	Z-248-A1	-A 40			Reserved for phase III & TDDS
	Z-248-A1	-A 41			Reserved for phase III & TDDS
	Z-248-A1	-A 42			Reserved for phase III & TDDS
	Z-248-A1	-A 43			Reserved for phase III & TDDS
	Z-248-A1	-A 44			Reserved for phase III & TDDS
	Z-248-A1	-A 45			Reserved for phase III & TDDS
	Z-248-A1	-A 46			Reserved for phase III & TDDS
	Z-248-A1	-A 47			Reserved for phase III & TDDS
	Z-248-A1	-A 48			Reserved for phase III & TDDS
	Z-248-A1	-A 49			Reserved for phase III & TDDS
	Z-248-A1	-A 50			Reserved for phase III & TDDS
	Z-248-A1	-A 51			Reserved for phase III & TDDS
	Z-248-A1	-A 52			Reserved for phase III & TDDS

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Configuration Item Description	ID #	UNIT ID#	Location	Serial Number	REMARKS
	Z-248-A1	-A 53			Reserved for phase III & TDDS
	Z-248-A1	-A 54			Reserved for phase III & TDDS
	Z-248-A1	-A 55			Reserved for phase III & TDDS
	Z-248-A1	-A 56			Reserved for phase III & TDDS
	Z-248-A1	-A 57			Reserved for phase III & TDDS
	Z-248-A1	-A 58			Reserved for phase III & TDDS
	Z-248-A1	-A 59			Reserved for phase III & TDDS
	Z-248-A1	-A 60			Reserved for phase III & TDDS
	Z-248-A1	-A 61			Reserved for phase III & TDDS
	Z-248-A1	-A 62			Reserved for phase III & TDDS
	Z-248-A1	-A 63			Reserved for phase III & TDDS
	Z-248-A1	-A 64			Reserved for phase III & TDDS
20 x 20 INCH DIGITIZER	MG2020A2	-A 65			
	MG2020A2	-A 66			
10 x 10 INCH DIGITIZER	AMF10-A3	-A 67			
	AMF10-A3	-A 68			
	AMF10-A3	-A 69			
	AMF10-A3	-A 70			
	AMF10-A3	-A 71			
	AMF10-A3	-A 72			
OPTICAL MARK READER	S5200-A4	-A 73			
	S5200-A4	-A 74			
	S5200-A4	-A 75			Reserved for phase III & TDDS
	S5200-A4	-A 76			Reserved for phase III & TDDS
	S5200-A4	-A 77			Reserved for phase III & TDDS
	S5200-A4	-A 78			Reserved for phase III & TDDS

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Configuration Item Description	ID #	UNIT ID#	Location	Serial Number	REMARKS
	S5200-A4	-A 79			Reserved for phase III & TDDS
	S5200-A4	-A 80			Reserved for phase III & TDDS
	S5200-A4	-A 81			Reserved for phase III & TDDS
LASER PRINTER	500+-A5	-A 82			
	500+-A5	-A 83			
	500+-A5	-A 84			
	500+-A5	-A 85			
	500+-A5	-A 86			
IMPACT PRINTER, DOT MATRIX	AFM2-A6	-A 87			
	AFM2-A6	-A 88			
	AFM2-A6	-A 89			
	AFM2-A6	-A 90			
	AFM2-A6	-A 91			
	AFM2-A6	-A 92			
56KB MULTIPLEXER	INFO-A7	-A 93	HRL BROOKS AFB BLDG 576		
	INFO-A7	-A 94	Bldg 428		
	INFO-A7	-A 95	Bldg 1808		
VAX 8600 COMPUTER	8600-A8	-A 96	HRL BROOKS AFB BLDG 576		
COLOR PRINTER - OKIMATE 20	OKI--A9	-A 97			
	OKI--A9	-A 98			
	OKI--A9	-A 99			
	OKI--A9	-A100			Reserved for phase III & TDDS
	OKI--A9	-A101			Reserved for phase III & TDDS
	OKI--A9	-A102			Reserved for phase III & TDDS
	OKI--A9	-A103			Reserved for phase III & TDDS
	OKI--A9	-A104			Reserved for phase III & TDDS

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Configuration Item Description	ID #	UNIT ID#	Location	Serial Number	REMARKS
	OKI--A9	-A105			Reserved for phase III & TDDS
	OKI--A9	-A106			Reserved for phase III & TDDS
	OKI--A9	-A107			Reserved for phase III & TDDS
	OKI--A9	-A108			Reserved for phase III & TDDS
	OKI--A9	-A109			Reserved for phase III & TDDS
	OKI--A9	-A110			Reserved for phase III & TDDS
	OKI--A9	-A111			Reserved for phase III & TDDS
	OKI--A9	-A112			Reserved for phase III & TDDS
	A10	-A113			
	A	-A114			
	A	-A115			
	A	-A116			
	A	-A117			
	A	-A118			
	A	-A119			
	A	-A120			
	A	-A121			
	A	-A122			
	A	-A123			
	A	-A124			
	A	-A125			
	A	-A126			
	A	-A127			
	A	-A128			
	A	-A129			
	A	-A130			
	A	-A131			
	A	-A132			
	A	-A133			
	A	-A134			
	A	-A135			
	A	-A136			
	A	-A137			
	A	-A138			
	A	-A139			
	A	-A140			
	A	-A141			
	A	-A142			

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